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special dyes for biological purposes. The National Aniline Company puts out an especially long list, so much so that this department of the company deserves to be considered with the specialists in biological stains to be mentioned below. Three other basic manufacturers—Dicks, David and Co., Varick and N. Moore Streets; Heller and Merz, 505 Hudson Street, New York City; McAndrews and Forbes, Camden, New Jersey—have shown a great deal of interest in the work and put on the market certain products that deserve to rank with the biological dyes and are handled by all the concerns mentioned below.

The specialists in biological stains either manufacture their products from the intermediates or else, whenever they know of a good source of some dye, buy it of the basic manufacturers and see that it comes up to their tests. This was and probably still is the function of Grüber and Holburn in Germany. The domestic concerns falling in this list that are at present in the business are:

Coleman and Bell, Norwood, Ohio.

Empire Biochemical Co., 920 Whitlock Avenue, New York City.

Harmer Laboratories, Lansdowne, Pa.

D. H. Pond, Blackstone Bldg., Cleveland, Ohio.

Providence Chemical Co., Providence, R. I.

as well as the Pharmaceutical Division of the National Aniline and Chemical Company, as mentioned above.

The last mentioned concern needs a further word of explanation because of a certain misunderstanding that is prevalent. In some of the earlier tests made by a committee of the Bacteriological Society, National Aniline products were listed, and they rank rather unfavorably. These, however, were the textile dyes, the only ones then sold by this company. The company has since then decided to specialize in biological stains and their present line of stains is entirely different from those mentioned in the earlier report. Another misunderstanding comes from the fact that when the Heyl laboratories failed, Dr. Heyl entered the employ of the National Aniline and Chemical Co., and the latter concern began marketing biological stains. This naturally gave rise

to the impression that the National Aniline Co. has taken over the Heyl Laboratories. Such is not the case, however, and the National Aniline line is distinctly different from those previously marketed by the Heyl Laboratories.

The third class of firms mentioned above needs very little mention here because they are quite well known to the biologist. Some of these laboratory supply houses like Central Scientific Co., A. H. Thomas Co., and E. Leitz Co. buy some one line of stains from the specialists in that line and advertise this fact; others buy dyes from the basic manufacturers and sell them as stains under their own name. Among the latter the Will Corporation deserves special mention because in the past they have manufactured stains where necessary and have standardized those that they have bought exactly as done by the specialists listed above. They are at present, however, stopping the manufacture of these products, now that satisfactory American stains are readily obtainable.

This article is published in the hope that it will assist users of stains in understanding the market and buying intelligently. All the concerns mentioned as dealing particularly in this line of business have given the committee hearty cooperation and are doing their best to market a satisfactory line of stains.

H. J. CONN, *Chairman*

COMMISSION ON STANDARDIZATION OF
BIOLOGICAL STAINS

LOWERY LAYMON LEWIS

THE death of Dr. Lowery Laymon Lewis, of the Oklahoma Agricultural and Mechanical College and Experiment Station, on September 26, has taken from the institution and the educational circles of the state a faithful worker and scientist whose loss will be keenly felt.

Dr. Lewis was born at Newport, Tennessee, on September 3, 1869. He received the B.S. degree at the Texas Agricultural and Mechanical College in 1893, and the M.S. in 1894 from the same institution. His studies were continued at the Iowa State College and in 1896 was granted the degree of D.V.M. During that year he came to the Oklahoma Agricul-

tural and Mechanical College as professor of veterinary medicine and state veterinarian. In 1899 he also became professor of zoology and experiment station bacteriologist. He gave himself up entirely to his work not only in the departments in which he was interested but to the school as a whole. That he was highly esteemed was manifested by the fact that in 1900, in addition to his other duties, he was made dean of the School of Veterinary Medicine and, in 1913, was also made dean of the School of Science and Literature. During the year 1915 he was made acting president and director of the experiment station. In 1921 he was made dean of the faculty.

Dr. Lewis was for a time a member of the American Association and was a working member of many scientific societies. Although quiet and retiring in personality, he was always ready to do his part in any enterprise of educational value for public welfare.

His research work was directed chiefly toward the diseases and the improvement of the livestock industry. In his earlier work he was much interested in parasiticides, anthelmintics and disinfectants. Later, he carried on a great deal of work toward the prevention and control of hog cholera and the prevention of tuberculosis in livestock. His most recent experimental work has been with the problem of sterility in domestic animals. In this connection he has shown some of the influences of a concentrated protein diet upon the potency of germ cells.

Dr. Lewis was at his best in his work about his laboratory surrounded by his students and associates. His personal interests were the last to be considered and he made it easy, and a source of pleasure, for his associates who worked with him. His own high ideals of service and love for the truth were the source of inspiration for many college generations. Many students went forth from his classroom filled with the love of science and guided by the example of his calm and thoughtful leadership to meet the problems of life with the same determination, standards and ideals that he imparted to them. Mere words can not summarize services such as he rendered to the

school and state. He left an inspiration in the field of altruistic endeavor which will always be held in high esteem by his students, friends and colleagues.

JOHN E. GUBERLET

OKLAHOMA AGRICULTURAL
EXPERIMENT STATION

SCIENTIFIC EVENTS

PRECISE STANDARDIZATION OF RADIO FREQUENCIES

THE Bureau of Standards has developed a very precise method of standardization of radio wave lengths and frequencies, which is the fundamental basis of radio measurements in this country. By the process used, the frequency of radio waves is compared with that of an audible musical note. A tuning fork is mounted in such a way that it may be made to control the frequency of an oscillatory circuit. The frequency of another oscillatory circuit operating at much higher frequencies is then compared with it by means of a cathode-ray oscillograph.

This latter instrument consists of the cathode-ray tube, a special kind of vacuum tube in which the narrow stream of electrons is subjected to the action of electric fields applied by the two alternating-current generators. When neither generator is operating, the electrons, impinging on the active screen at the end of the tube, cause a single luminous spot. If one generator is connected, the spot is deflected back and forth along a single line, horizontal or vertical as the case may be, with such rapidity that it appears as a solid line. If both generators are applied simultaneously, the spot oscillates both horizontally and vertically and appears, in general, as a blurred luminous rectangle. If, however, the frequencies of the two generators bear a simple ratio, such as four to one, the spot traverses and retraverses a definite simple path, forming a figure by which the frequency ratio may be recognized. It has been found possible to compare frequency ratios as high as twenty-one to one.

The bureau is at present engaged in the standardization of a high precision standard